1-YEAR LIMITED WARRANTY

The *iGen NV20/20* is warranted against defects in materials and workmanship under normal use for one year from the date of purchase to the original owner.

Damage due to neglect, accidental damage or misuse of this product is not covered under this warranty. Decisions regarding abuse or misuse of the product are made solely at the discretion of the manufacturer.

Proof of Purchase is required to make a claim under this warranty.

Liability under this Warranty is limited to replacing or repairing, at our option, the product returned, shipping cost prepaid to Night Owl Optics. Shipping cost to Night Owl Optics is the responsibility of the consumer.

To return product for service, please first contact Night Owl Optics for a Return Authorization (RA) Number. Ask for Night Vision customer service. Reference the RA number on your package and return the product within 15 days of calling to:

Night Owl Optics
1465-H Henry Brennan Dr.
El Paso, TX 79936
Phone: 915-633-8354

Warranty coverage does not include the cost of transporting the product back to an owner who is located outside of the United States of America.

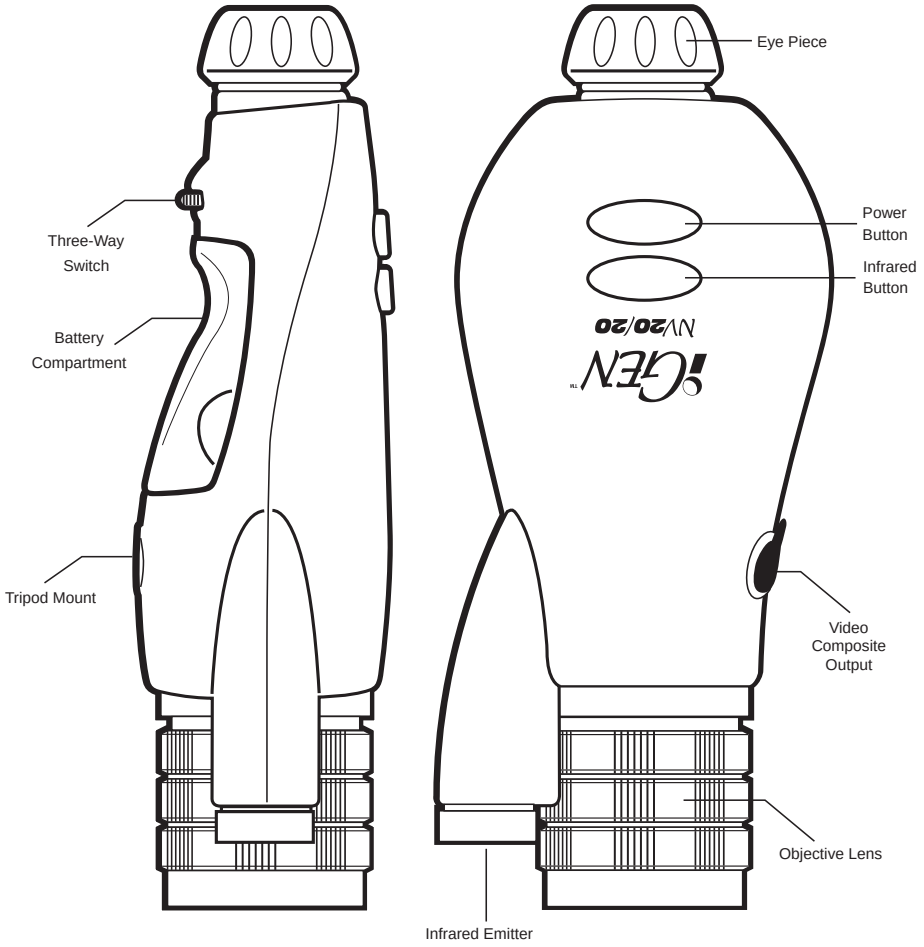
OPTICS PLANET INC

iGEN™

NV20/20

NIGHT VISION VIEWER

OWNER'S MANUAL



CAUTION:

Do not point Infrared Emitter directly into eye at close range.

Keep out of reach of children.

The infrared emitter emits a **BRIGHT,** although invisible, beam of light. As with any bright light, do not point into the eye.

Menu System

The menu selections are:

- EXPOSURE (Adjustable from 2fps to 30fps)
- AUTO OFF (1.2.3.4.5.10,15,20,30,45 minutes or OFF)
- IR
- MAIN
- DISPLAY
  - ON-OFF
    - ON
    - OFF
  - BRIGHTNESS (1,2,3,4)
- COLOR (white, red, green, amber)
  - IMAGE
  - TEXT
- SYSTEM
  - VIDEO
    - NTSC
    - PAL
  - VERSION displays software revision level
- EXIT

Other Features

Power-Savings Features

Display Off

When using the iGen connected to an external recording device, and you do not need to view the scene through the eyepiece, you may turn the display off. This will greatly improve battery life.

To turn the display off, choose "Display", then "On-Off". When you toggle down to the "Off" setting, the display will immediately turn off. After the display turns off, you must then push the 3-way switch up to save this setting. If you do not accept the off-setting by pushing up after the display turns off, the display will turn back on after ten seconds.

To turn the display back on, turn power off and then turn power back on with the On/Off Button.

Auto-Off

The menu selection "Auto Off" allows you to program the time interval after which the device, or the IR, automatically turns off. Each user input (press of a button) resets the auto-off timer.

Time selections are 1,2,3,4,5,10,15,20,30,45 minutes and OFF.
The OFF setting disables the auto-off power down feature.
To save the setting, remember to push the 3-way switch up after selection.

The infrared and operating power-down timers are set separately. If the IR auto-off time is less than the main time, the IR will shut off first, and the device will then power off after the main time has elapsed.

Daytime Use

To use in daylight conditions, leave the lens cap attached and operate at low gain settings

Tripod Adaptor

The tripod fitting is located on the underside of the device, and fits to all standard tripod mounts with a fitting size of 1/4 - 20.

Tripod mount is recommended for exposures of less than 10fps for image stabilization.

Introduction

The iGen Night Vision Viewer is the leading edge of the new tubeless night vision technology. Traditional night vision devices employ electron bombardment vacuum tube technology to amplify ambient light. iGen technology uses image processing techniques, special optics, and low-light sensing technology to bring night vision into the digital age.

The iGen advantage is:

- Better image quality with high, 30-line-pair per millimeter, edge-to-edge display resolution
- Better image quality with no image distortion from photocathode or phosphorescent screen blemishes
- Easier diopter focusing
- Two-times the sensitivity to infrared light, useful in total darkness with the aid of the infrared emitter
- Intelligent infrared emitter. Microprocessor automatically adjusts infrared intensity and electronic gain to optimize image to changing ambient light conditions.
- Undistorted infrared emitter – bright clear scene illumination with no dark spots and no uneven light patterns
- Ambient light amplification capability higher than Generation-1 technology at default exposure. Light amplification capability superior to Generation-2 with the use of exposure control.
- Easy-connect image capture capability through composite video output
- Programmability
- Bright-light see-through capability. No bright-spot blooming or halo-effect typical with conventional night vision.
- More robust. No risk of damage from bright light exposure. No fragile vacuum tubes.

Batteries

Requires 4 AA alkaline batteries

Typical battery life from one set of batteries is 4.5 hours in continuous use, or 2.3 hours in continuous use with the infrared emitter at maximum intensity.
To improve battery life, reduce brightness or program the auto-off feature to cause the device to automatically shut down after specified intervals.

1st Time Operation

To best understand operation, for first-time use, test the device in a lighted room **with the lens cap attached.**

The small amount of light entering through the pin-hole in the lens cap will simulate a night-time environment.

Press the **power button** to turn on.

Push up on the **three-way switch** located on the bottom.

Focus eyepiece.

1. A menu will appear. Use this menu to focus the eye piece.
2. Rotate the eyepiece rubber cup until the menu letters are sharp and in focus. If the menu disappears, push up again to see the menu again.
3. Use the menu as a focusing target. This adjustment focuses your individual eye sight on to the display screen.
4. After the eyepiece focus (technically called the diopter lens) is adjusted, do not change this adjustment. After you set the eyepiece adjustment, use the front lens to focus on objects in the distance.

Get comfortable with the **gain control.**
Push the **three-way switch** to the left and to the right.
As you push the switch left or right (but not up), you are manually adjusting the electronic gain (light amplification) of the internal computer circuit.
Notice the following as you increase gain (push to the right):

1. At very high gain settings, the image gets "nosier". Notice a "snowy" image at high gain settings.
2. As you increase the gain quickly, you may notice a momentary very bright image which quickly darkens itself back to normal intensity. This behavior is the device sensing that the image is overexposed, and automatically reducing internal gain and/or exposure to compensate. In an actual dark environment, iGen would not throttle back the gain in this manner.
   If the "overexposed image" message appears, it is prompting you to reduce gain. If this message disappears automatically, then the internal processor was able to automatically reduce the gain or exposure.

Notice that rotating the objective lens (large lens on front of iGen) has little effect on the focus of the image. The pin-hole on the lens cap lets in only a narrow beam of light which requires little mechanical focusing to align. If the scene is out of focus, you may need to rotate the lens many degrees to achieve a small amount of optical focusing. This characteristic will not be apparent when using the iGen with the lens cap removed.

Press the **Infrared Button** several times.
Notice that it has 3 different modes: AUTOMATIC, OFF, and MAXIMUM

Adjustments *(continued)*

Exposure (continued)
While light-gathering capability improves with longer exposure times, at exposure settings below 15fps, the image will appear unnatural. Longer exposure settings (lower fps numbers) present fewer and fewer image "snapshots" which are presented to you just as a movie is a collection of frames repeated at 30 frames per second. Below 15fps, a moving image may appear to move unevenly. Likewise, below 12fps, the image may shake as a person is unable to hold the iGen completely still. If you concentrate on holding the device still, you should find the device very useful down to 10 or 12fps.

At very long exposure times, down to 2fps, the light-gathering capability of the iGen is truly remarkable. However, to be useful at such long exposure times the device must be positioned on a stable surface. You may rest it on a flat surface suitable for viewing, or connect to a tripod mount. The tripod adaptor fitting located at the base of the device will connect to all standard tripod mounts, with a fitting size of 1/4 - 20.

8. Video Format
When recording on an external device using the Video Composite Output, select the format compatible to your recording device.

Selections are:

NTSC (for devices sold in the U.S. This is the default setting)
PAL (European standard)

To record to an external device, remove the rubber plug on the left side of the device, and connect with a composite video cable (RCA cable). With the iGen powered on and focused, no other iGen settings are necessary. If use of the eyepiece display is not required, extend battery life by turning off the display with the "display on/off" function.

***Adjustments** (continued)*

4. Gain

The 3-way switch adjusts the internal or electronic gain. There are a total of 10 different gain settings. These settings are preprogrammed and cannot be changed. Push to the right and the image becomes brighter. At the highest gain settings, you will notice a "noisy" or "snowy" image. As is the case with any night vision device, in very low light conditions users will sacrifice image quality for light amplification. In order to recognize an object or target, it is preferable to see a lower resolution image than to see no image at all.

5. Color

Both the color of the image and the color of the menu text can be changed. Image color choices are white, red, green, and blue. Text color choices are black & white, green, red, and amber. The color green is typically used in night vision applications because the rod cells in the human eye are most sensitive to the green wavelengths of light, 550nm. You are better able to distinguish details when displayed in the color green. The color red can be useful when you want to maintain your unassisted vision in the dark when you look away from the viewer.

6. Brightness

The display brightness has 4 settings. The default setting is 3. The darkest is 1; the brightest is 4. As the display is a major consumer of battery power, darker brightness settings will prolong battery life.

Access the brightness control by first choosing "display" from the menu and then choosing the brightness option.

7. Exposure

The most effective way to increase the low light sensitivity of the iGen is to increase the exposure time of the system. In its default setting, the iGen collects light from the lens at a rate of 30 times per second for processing. If this exposure time is increased, more photons of light energy are collected, resulting in greater night-vision sensitivity. At the default setting, the "shutter" remains open for 1/30th of a second and then closes and passes the collected light on for processing. If we allow the "shutter" to remain open for a longer period of time, we collect more photons and thus can "see" at lower light levels. The abbreviation "fps" means "frames per second."

In a lighted indoor environment, you may notice a pulsing or strobe effect at varying exposure settings. In the U.S., or other countries with 60hertz electrical systems, exposure rates other than 30fps and 15fps will be unsynchronized with the lighting system. The iGen is designed for outdoor use and for use in dark environments so this characteristic does not affect the device's performance; such a pulsing effect will only be evident when testing or practicing with the iGen in a lighted environment.

In countries with 50 hertz electrical systems, indoor pulsing will be apparent at all frame rates.

Infrared Emitter

The basic principle employed by iGen is light amplification. In very dark conditions, where you cannot see, and your eye cannot detect the small amount of light that is available, the iGen detects and amplifies very small amounts of available light. But in the absence of any available light, use the infrared emitter.

To understand how much light is available in different environments, review the following table. Light intensity is measured in lux. One lux is roughly the amount of light created by a candle at a distance of one meter.

The number of lux existing in different environments is:

Condition	Number of Lux	iGen Function.
Sunny Day	100,000+	Too bright. Keep lens cap on.
Overcast Day	100 to 10,000	Too bright. Keep lens cap on.
Indoor Lighting	80 to 300	Keep lens cap on.
Street lighting at night	1 to 10	No IR(infrared emitter) needed.
Full Moon	0.1	No IR needed.
Quarter Moon	0.01	IR might be needed.
Clear night with no moon	0.001	IR necessary at distance.
Dark Cloudy Night	0.0001	IR absolutely necessary.

Night Vision technology works by amplifying the small amounts of light energy available in most dark environments. If you are in an environment where there is NO LIGHT available to amplify, then the mathematical formula:

zero times *any number* = zero (0 x N = 0)

describes what you can see without assistance from an infrared emitter – nothing.

For this reason, the iGen is equipped with an active infrared emitter. iGen emits an invisible beam of near-infrared light. The beam of light exiting the emitter is not visible to human or animal eyes but is detected by the iGen and reproduced on the display. In most environments, you do not need the infrared emitter, but in complete darkness, turn the IR on to the AUTO or MAX settings. The default setting of the IR at start-up is the AUTO mode. Also notice that while the light emitting from the IR is invisible, the diode does glow a bright red inside the emitter and can be detected from a distance. If you wish to remain completely concealed, then do not use the infrared emitter.

CAUTION: Do not point INFRARED directly into eye at close range
Keep out of reach of children

The infrared emitter emits a BRIGHT, although invisible, beam of light. It is not a laser, but like any bright light, you do not want to point it directly into your eye.
The infrared light emission is produced by a light emitting diode, similar to those used in modern flashlights.

Controls

1. On/Off Button

On top side, closest to your eye
Press to turn on. Press to turn off

2. Infrared Button:

On top side, closest to the large front lens
Pressing button activates one of three different modes:

IR AUTO: the infrared emitter will measure the amount of ambient available, and emit a calculated amount of light to illuminate the scene as required. This setting will conserve battery life and is usually the preferred setting if you have decided that the environment is so dark that you cannot see well without its assistance.

IR MAX: the infrared emitter will output the maximum amount of infrared light possible for maximum illumination at all times. Constant use at this setting will minimize battery life.

IR OFF: no infrared light is emitted

3. Three-Way Switch

Located on the underside of unit, rear of battery door, near your thumb as you hold the device

Push left to decrease electronic gain
The image will darken with each press of the switch

Push right to increase electronic gain
The image will brighten with each press of the switch

Push up to activate the **menu** and program the iGen.

The programming function works as follows:

1. After menu activation, the menu will **time-out** in ten seconds if you do not make a selection.
2. To **move through** the menu selections, push the 3-way switch **left or right.**
3. To **choose** a menu selection for programming, **push up** on the 3-way switch. You will choose the selection indicated by the arrow.
4. To **program** a setting, move the 3-way switch **left or right.** See the settings change.
5. To **accept a setting** after programming, **push** the 3-way switch **up.**
6. When a setting is entered using the left/right control, the setting becomes active immediately, but you must **push** the 3-way switch **up** to permanently accept the setting. If you do not accept a setting after 10 seconds, the menu will time-out and the previous setting will return as the permanent setting.

Adjustments

1. Eyepiece (technically referred to as the diopter focal lens in front of the microdisplay)
The iGen has two different focus adjustments. The eyepiece lens adjusts to focus the display to your individual eyesight. The objective lens focuses on objects in the distance.

To adjust the eyepiece, do the following:

a. Push up on the three-way switch located on the bottom.
b. The menu will appear. Use this menu as a target to focus the eye piece.
c. Rotate the eyepiece rubber cup until the menu letters are sharp and in focus. If the menu disappears, push up again to see the menu again.
d. Use the menu as a focusing target. This adjustment focuses your individual eye sight on to the display screen.
e. *After the eyepiece focus is adjusted, do not change this adjustment, even if the image is out of focus.* After you set the eyepiece adjustment, use the objective (front) lens to focus on objects in the distance.

2. Objective Lens (large lens in metal housing on front of device)
This lens must be manually rotated to bring objects into focus. As you aim at different objects at different distances, you may need to rotate the lens to bring the objects into focus. This operates just like a pair of binoculars.

Lens Specifications are as follows:
Minimal Focal Distance: 16" (41cm)
Maximum Focal Distance: infinity.
Ability to see objects at a distance depends on object size and ambient light conditions.
Angle of View: 12°
Field of View: 70'at 330' distance (21 meters at 70 meter distance)
Magnification: 2.6 times

3. Infrared Emitter
You cannot adjust the intensity or light angle of the infrared emitter. The emitter casts a 12° angle of light, equal to that of the iGen's angle of view. Because the emitter is positioned to the side of the objective lens, at short distances you will notice a shadow due to this offset. The infrared produces a round beam of light; at close distance, the circle of light will clip the corners of the rectangular display. At very close range, you may see a half-circle of bright light, while the rest of the scene is darker. You cannot control the intensity of the infrared light, other than to set it in automatic mode. In automatic mode, the output of the emitter is adjusted to provide the correct amount of infrared required for optimum illumination. Since the device is very sensitive to infrared light, high intensity infrared at close range causes the device to reduce internal gain and increase exposure time, resulting in rapid battery discharge. Use of the IR MAX settings is only recommended in a very dark outdoor environment.